



Management Initiatives Along the South Platte River -The Northern Colorado Water Conservancy District

The Northern Colorado Water Conservancy District (based in Loveland, Colorado) begins north of the Denver metropolitan area and extends more than 1.2 million acres along the South Platte River and its tributaries to the Colorado-Nebraska border. The alluvial aquifer along the South Platte has been extensively developed for irrigation, industrial and municipal purposes, and drinking water. However, high nitrate levels are presently found in wells serving several municipalities. These communities have been forced to seek alternative drinking water supplies. The available alternatives, ranging from reverse osmosis treatment plants to participation in a regional water supply pipeline, are costly to residents.

In addition to health concerns, the nitrogen also potentially jeopardizes the production of high quality sugar beets and malting barley, the district's major cash crops (approximately 40,000 acres of sugar beets are also grown in the basin, with gross revenues exceeding \$30 million annually).

Demonstrating total resource management

The Northern Colorado Water Conservancy District is sponsoring a demonstration of total resource management for irrigated cropland. Two small farms of 45 and 20 acres, respectively, provide area producers an opportunity to evaluate whole farm management and the transferability of similar management practices to their own operations. At the same time, they can assess the program's cost-effectiveness because the farms have real expenses and income.

Two chapters of the Colorado Young Farmers Education Association -- the Thompson Valley Young Farmers and the Valley Young Farmers -- provided the demonstration farms. Together these Young Farmer chapters have more than 80 active members farming an estimated 20,000 irrigated acres in the project area. Each chapter served as the advisory committee for operations at its farm site.

The agribusiness community near each farm also made significant contributions; it provided inputs for crop production, including seed, agrichemicals, compost, manure, and equipment. The young farmer organizations prepared the ground prior to planting and provided seed, fertilizer, chemicals, and the water for irrigation. The District was responsible for planning and performing all other field operations necessary for normal crop production.

CHALK CREEK WATERSHED

Irrigation practices and results

All fields were furrow irrigated. The control fields were conventionally irrigated, while water was applied to the others with surge valves and gated pipe. Surge valves pulse water across the field, cycling water back and forth between two alternating sets of furrows, using a solar powered controller. The valves allow the field alternate wetting and drying cycles during irrigation, which permits more uniform application across the field and generally improves the efficiency of water use. Conventional furrow irrigation ranges from 25 to 60 percent efficiency; surge irrigation efficiencies range from 30 to 80 percent.

Groundwater was analyzed for nitrate-nitrogen on the Thompson Valley Farm, using samples from four observation wells. The wells were sited so that one pair represented water entering the site, while the other pair represented water leaving the site.

In addition to the field demonstrations, the District also operated a surge valve trial program. Cooperating producers had free use of a surge valve for one irrigation season, as a way of introducing them to the unfamiliar technology. District personnel provided technical assistance in programming the valve and suggesting installation options. Where practical, irrigation application efficiencies were calculated from measures of the amount of water applied and field runoff. Of the 72 valves loaned during a three-year period, 60 percent were subsequently purchased by the producers.

Table 1. Irrigation efficiencies on demonstration farms along the South Platte.

Thompson Valley Young Farmers Field, Crop, Irrigation Method		Irrigation Efficiencies	
	Field Size	1995	1994
Sugar Beets	5.7 acres	9%	36%
Corn 1 - surge	6.5 acres	52%	33%
Corn 2 - surge	5.8 acres	48%	34%
Corn - conventional	18 acres	31%	N/Z
Valley Young Farmers			
Corn 1 - surge	5.8 acres	46%	21-36% ¹
Corn 2 - surge	4.8 acres	39%	21-37% ¹
Corn - conventional	10 acres	36%	N/A

¹ Fields were conventionally irrigated during first half of season at 21% efficiency. Surge valves were used during second half of season, increasing efficiencies to 36% and 37%.